

CLAIMS:

1. A method of determining reflected power in a switching circuit (50; 200; 300), the circuit (50; 200; 300) comprising an inductive component including at least one winding, and switching means coupled between at least one source of power (60) and said at least one winding wherein the switching means is further coupled to driving means for periodically
5 driving the switching means into conduction to transfer power from the at least one source to the inductive component, the method including the steps of:
determining a measure of a magnetizing current present in the inductive component;
deriving a measure of hard switching occurring in the switching means;
10 determining a measure of reflected power being transferred through the inductive component from the measure of the magnetizing current and the measure of hard switching.
2. A switching circuit (50; 200; 300) comprising:
15 an inductive component (TR) including at least one winding (P1, S1, S2; switching means (FET1) coupled between at least one source of power (60) and said at least one winding, the switching means being coupled to driving means (100) for periodically driving the switching means into conduction to transfer power from the at least one source to the inductive component;
20 first monitoring means (115; 220, 230, 215) for determining a measure of a magnetizing current present in the inductive component;
second monitoring means (120) for deriving a measure of hard switching occurring in the switching means; and
processing means (140, 150, 160, 170, 175) for generating a measure of
25 reflected power being transferred through the inductive component from the measure of the magnetizing current and the measure of hard switching.
3. A circuit (50; 200; 300) according to Claim 2, wherein the circuit (15; 200; 300) further comprises feedback controlling means (170, 175) for comparing the measure of

reflected power with a reference (160) and for regulating temporal operation of the driving means so that a predetermined degree of hard switching arises within the circuit in operation.

4. A circuit according to Claim 2, wherein the first monitoring means are
5 operable to determine the measure of the magnetizing current present in the inductive component by way of emulation from a signal developed across said at least one winding.
5. A circuit according to Claim 4, wherein the first monitoring means are
operable to utilize a temporal integration of the signal to generate the measure of the
10 magnetizing current.
6. A circuit according to Claim 5, wherein the temporal integration is
periodically reset in synchronism with switching operation of the switching means.
- 15 7. A circuit according to Claim 2, wherein the first monitoring means include current sensing means (220, 230) in series with said at least one winding for generating the measure of the magnetizing current.
8. A circuit according to Claim 7, wherein the sensing means comprises a
20 plurality of sensors (220, 230), each sensor being configured in series with its corresponding winding of the inductive component.
9. A circuit according to Claim 8, wherein current indicative signals generated by
the plurality of sensors are summed together taking into account relative ratios of winding
25 turns of their respective windings to generate the measure of the magnetizing current.
10. A circuit according to Claim 3, wherein the feedback controlling means are
arranged to:
30 regulate the measure of hard switching in respect of a first reference;
regulate a difference of the measure of the magnetizing current and an hard-switching error signal with respect if a second reference,
for purposes of regulating operation of the circuit, the error signal being derived from a
difference between the measure of hard switching and the first reference.

11. A circuit according to Claim 10, wherein the second reference (160) is a function of at least one of a voltage provided by the at least one source of power, a capacitance of the switching means, and an inductance presented by the inductive component.

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12. A circuit according to Claim 12 adapted for a bi-directional flyback converter, the converter being arranged so that its inductive component is a transformer including a primary winding for connection via the switching means to the source of power, and at least one secondary winding, the measure of the magnetizing current and the measure of hard
10 switching being generated from signals arising in operation in the at least one secondary winding.